

Objection to the Drawings

The drawings were objected to under 37 CFR 1.83(a) in view of the “lateral transistor,” “trench capacitor,” and “conductorless electrical connection” limitations in the claims.

Claims 17, 31, 33, 36 and 41 have been amended to remove the word “lateral.” Further, a new claim 51 has been added directed to an embodiment of the invention involving a lateral transistor, as described on page 10, line 18 through page 11, line 4, and as shown in the drawings in FIG. 6.

The “trench capacitor” is shown in the drawings as item 119. Also, the “conductorless electrical connection” is present in the drawings as it is claimed, namely as the first plate and second plate integral with the first source region of the transistor. As the claims state and as the drawings show, this combination of items *is* the conductorless electrical connection. This point is explained more fully below.

Objection to the Specification

Applicant’s amendment filed 7/20/01 was objected to under 35 U.S.C. § 132 because Examiner believes it introduced new matter into the disclosure. The alleged new matter is “a first plate of polycrystalline material formed in the trench that is coupled to a second plate integral with the first source/drain region thereby forming a conductorless electrical connection between the trench capacitor and the transistor.”

Applicant respectfully submits that the above does not constitute the introduction of “new matter.” Applicant amended the claims in the previous amendment to include a feature *expressly disclosed* on page 6, line 28 through page 7, line 1, namely “that there is no need for a contact between second source drain region 110 and capacitor 119” because of the claimed structure.

The electrical connection in the claimed invention is not a contact formed from a conductor, but instead is the first plate of polysilicon material formed in the trench in combination with the second plate formed integral with the first source/drain region of the transistor. By virtue of these elements and their arrangement, there is no need for the usual type of contact.

Assuming, for the sake of argument, that Applicant did not expressly disclose this feature, Applicant is still entitled to amend the application to include the feature. This is because the patent law recognizes that where a structure or feature is inherent to an invention, the application can be amended to include the inherent structure or feature without it being considered as adding new matter. See, e.g., *In re Smythe*, 178 USPQ 279, 285 (C.C.P.A. 1973).

Accordingly, Applicant respectfully submits that the claims as presented in the previous amendment (an in the present amendment) are based on subject matter either expressly or inherently present in the specification and drawings, so that no new matter has been added to the disclosure. Applicant therefore respectfully requests the withdrawal of the new matter objection.

§112 Rejection of the Claims

a) Written description

Claims 17-19, 22-23, 26-27, 29, and 31-50 were rejected under 35 USC § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention (i.e., the “written description” requirement). In particular, the Examiner raises questions pertaining to the “conductorless connection” limitation.

Applicant’s invention embodied in the above-cited claims is directed to eliminating the need for using conductors to electrically connect the capacitor to the transistor in memory cell. This is achieved by forming one of the plates of the capacitor as a single crystalline extension of the source/drain region of the transistor. This is what is meant by the plate being “integral” with the source/drain region. Such a design leads to a “conductorless” electrical connection between the capacitor and the transistor, as mentioned. The savings in space allows for a more highly integrated memory cell.

As discussed above, the conductorless connection inherently exists in the claimed structure. Plates 110 and 120 are capacitor plates, and it is understood by one skilled in the art that they are capacitively coupled to one another through the gate insulator. Because plate 110 is also serves as a source drain region of transistor 111, there is an electrical connection established

between the capacitor plates and the transistor. Because of this electrical connection, there is no need for an electrical contact, as required by the cited prior art.

Examiner points out that body region 108 is not conductorless. However, the body region is not part of the claimed conductorless electrical connection, but rather is part of the transistor to which the conductorless electrical connection is made.

Claims 17, 31, 33, 36 and 41 have been amended to remove the word “lateral,” thereby removing the issue of whether there is support in the specification for this limitation in the cited claims.

Accordingly, Applicant respectfully submits that the above claims satisfy the written description requirement of 35 U.S.C. § 112, first paragraph, and respectfully request withdrawal of this rejection.

b) Indefiniteness

Claims 17-19, 22-23, 26-27, 29, and 31-50 were rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention (“indefiniteness”). In particular, the Examiner raises a question as to the meaning of the word “integral.”

By way of clarification, the provisional interpretation of “integral” provided in the Office Action as meaning that “the first plate is the same structure as the source/drain region 110 since it is formed in the trench,” is consistent with Applicant’s intended meaning. In other words, the portion of source/drain region 110 capacitively coupled to plate 120 also serves as the “first” capacitor plate, as described on page 6, line 27. As pointed out in the previous amendment, the first plate is a single-crystalline extension of the transistor source/drain region 110.

Applicant respectfully submits that, in view of the specification and drawings that describe and illustrate the claimed invention in a manner consistent with the understood definition of “integral” as clarified above, the above-cited claims are not indefinite. Accordingly, Applicant respectfully requests that the rejection of the claims based on indefiniteness under 35 U.S.C. § 112, first paragraph, be withdrawn.

§103 Rejection of the Claims

Claims 17-19, 22-23, 26-27, 29, and 31-50 were rejected under 35 USC § 103(a) as being unpatentable over Wen '509.

Applicant respectfully submits that the Examiner has not established a *prima facie* case for obvious as to the claimed invention. In the previous amendment, Applicant amended the claims to distinguish its memory cell from that made possible by Wen by adding the specific structural limitation that the electrical connection between the transistor and capacitor be "conductorless" by virtue of one of the capacitor plates being integral with (i.e., a single-crystalline extension of) one of the transistor source/drain regions. Examiner's citation of the fact that it is known that capacitors are connected to the source/drain regions of a transistor does not address the specific claim limitation of a ***conductorless connection***, which Applicant believes is heretofore unknown in the art.

None of the cited prior art references teach or suggest this feature. Thus, the cited references cannot be combined to arrive at Applicant's claimed invention. Accordingly, Applicant respectfully submits that the above-cited claims are not obvious in view of the cited prior art and respectfully requests withdrawal of the rejection.

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Applicant respectfully submits that the claims are in condition for allowance and respectfully requests withdrawal of the several objections and rejections. Notification of allowance of the claims is earnestly requested. The Examiner is invited to telephone Applicant's attorney (612-373-6913) to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

LEONARD FORBES ET AL.

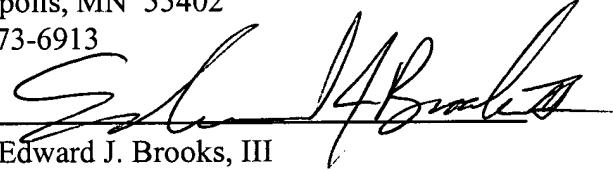
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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Commissioner of Patents, Washington, D.C. 20231, on this 10th day of January, 2002.

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